



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## ZONATION IN ARTIFICIAL CULTURES OF CEPHALOTHECIUM AND OTHER FUNGI.

BY GEORGE GRANT HEDGCOCK.

The results given in this paper are from a continuation of the investigation, mention of which was made in a brief paper to the American Mycological Society at the Philadelphia meeting, December, 1904, and are published by permission of the Secretary of Agriculture.

Certain fungi like *Cephalothecium*, *Penicillium*, *Mucor* etc., often exhibit in artificial cultures a distinct zonation of the mycelium due to denser masses of spores being formed daily on certain portions of the mycelium, often giving an agar plate culture the ringed appearance of a target. Last year it was proven by a set of experiments that daily variations of temperature are not the cause of this zonation. At the same time it was shown that they were not produced under conditions of total darkness, but occurred only in cultures grown in the light.

In order to determine what colors of light affect spore formation, cultures of *Cephalothecium*, *Penicillium*, *Mucor*, and *Hormodendron* were grown on agar plates under five conditions of light. Double bell jars of ordinary glass were filled with solutions as follows: for orange light, potassium bichromate; for red, a cochineal solution; for blue, a mixture of ammonium and copper carbonate; for green, a mixture of "anilin gelb" and "licht grün;" for ordinary light, a double bell jar without a solution; and for darkness, a tight, black-lined box. No spectrum analysis of the rays of light transmitted by some of these solutions has yet been made.

The cultures grown under red and orange light, and in darkness, exhibited a uniform dense spore formation over the whole surface of the mycelium in every instance.

The cultures grown under blue light and in ordinary light, in every instance exhibited distinct daily rings of

growth of alternating denser spore formation of a texture similar to that of the former set of cultures; but between the denser concentric rings were regions where spores were only sparsely formed.

Cultures under green light exhibited rings of growth of less distinctness, indicating that it is the blue rays of light that affect spore formation. Careful observation established that the rings of sparse spore formation are formed in the daytime, and the denser at night, proving that the blue rays of light inhibit spore formation in these fungi.

Cultures of *Cephalothecium* taken from decaying sugar beet roots and from rotting apples were much more sensitive to blue light than the same fungus taken from the fruits of *Rosa rugosa*. The species from all these sources was one and the same, if mycological characters were to decide the question; yet, the difference in growth on various media under blue light suggests that we have two distinct physiological forms of *Cephalothecium roseum*. The form occurring on apples and sugar beets grows more often in the dark in nature, in stored apples and beets; the one on the fruits of the rose is found growing on the rose fruits in open light. May it not be that the latter has become more accustomed to strong light, and is less affected by the blue rays?

There is another type of zonation in artificial cultures of some fungi which is not due to light stimuli, but probably to variations in the amount of food taken in by the mycelium, and to possible resting periods in spore formation. This type has been observed by the writer in a number of species of fungi; among these is *Hypocrea*. Thomas Milburn mentions this type of ring formation in his studies of *Hypocrea rufa* and other fungi.\* In *Hypocrea* the concentric rings are formed, not daily, but in a much longer period of time.

---

\* See Centralbl. für Bakt. Par. u. Infek. **13**: 129-138.

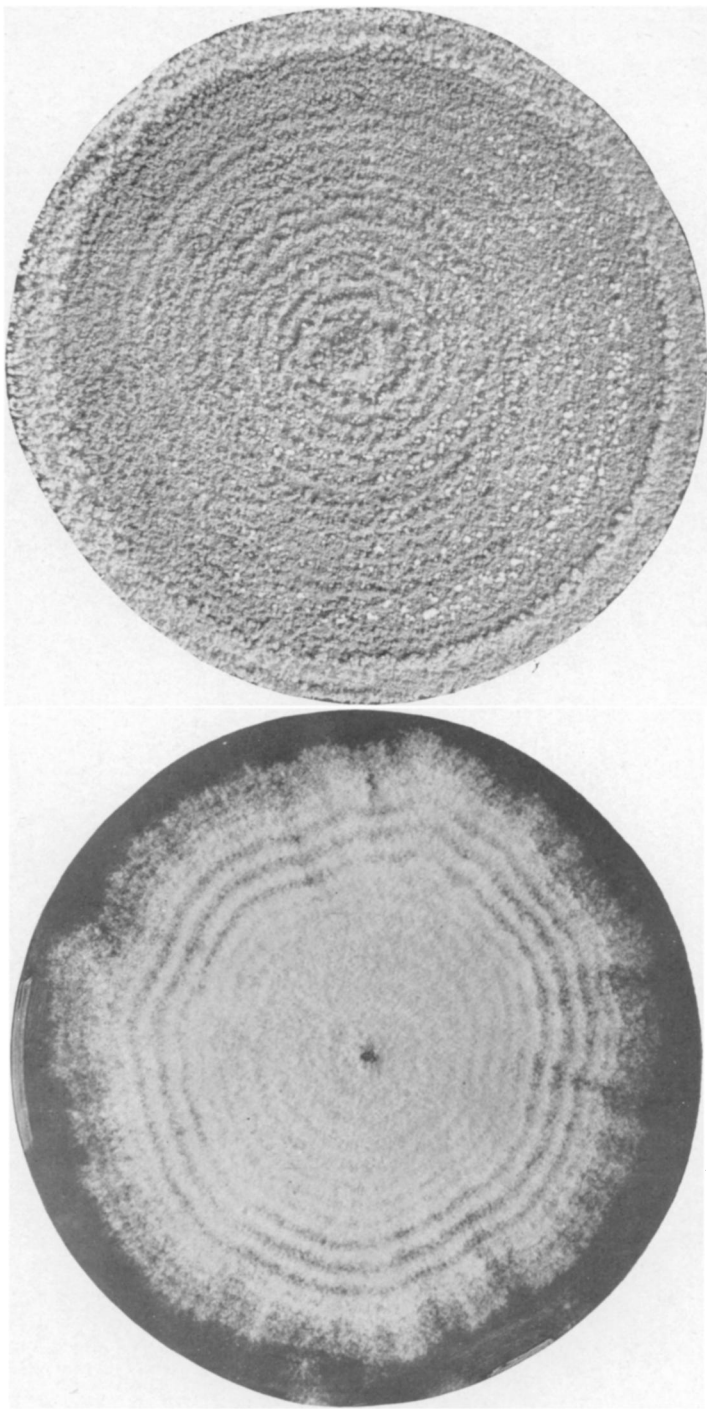
## EXPLANATION OF PLATES.

Plate 13. — 1. *Penicillium album*, grown in the light. 2. *Cephalothecium roseum* from sugar beet roots, grown in light. — Natural size.

Plate 14. — 1. *Cephalothecium roseum*, from apple, grown in darkness. 2. Same, grown in light.

Plate 15. — 1. *Cephalothecium roseum*, from *Rosa rugosa* fruits, grown in darkness. 2. Same, grown in orange light. — Colonies enlarged.

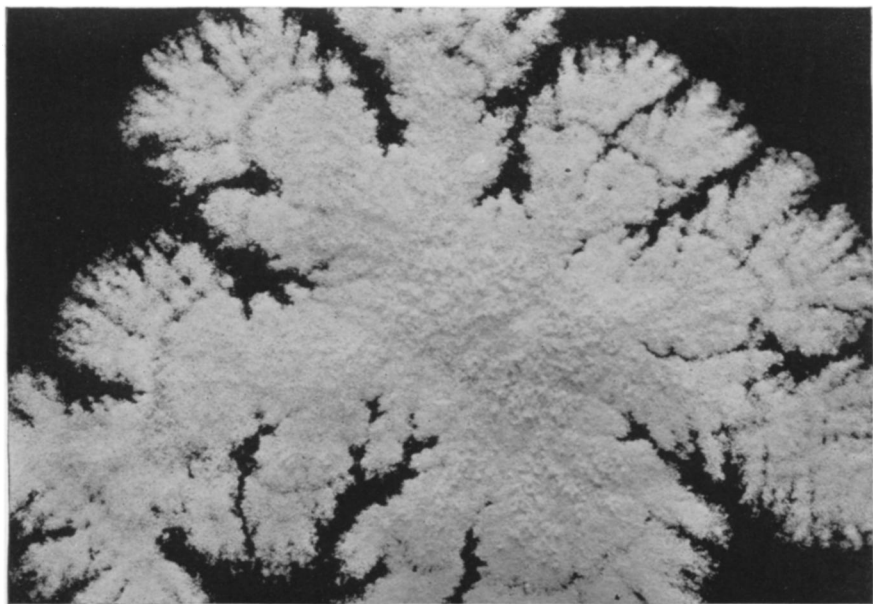
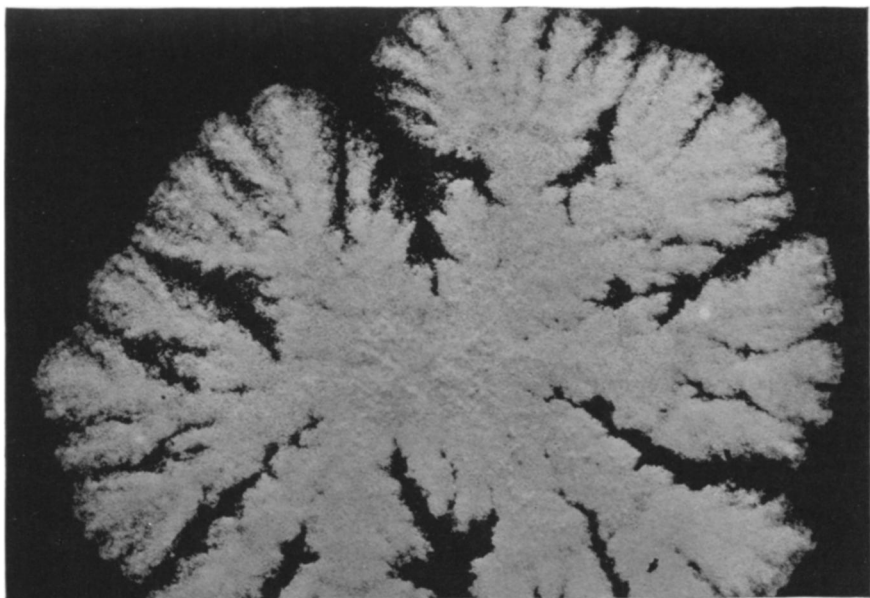
Plate 16. — 1. *Cephalothecium roseum*, from *Rosa*, grown in blue light. 2. Same, grown in natural light. — Colonies enlarged.



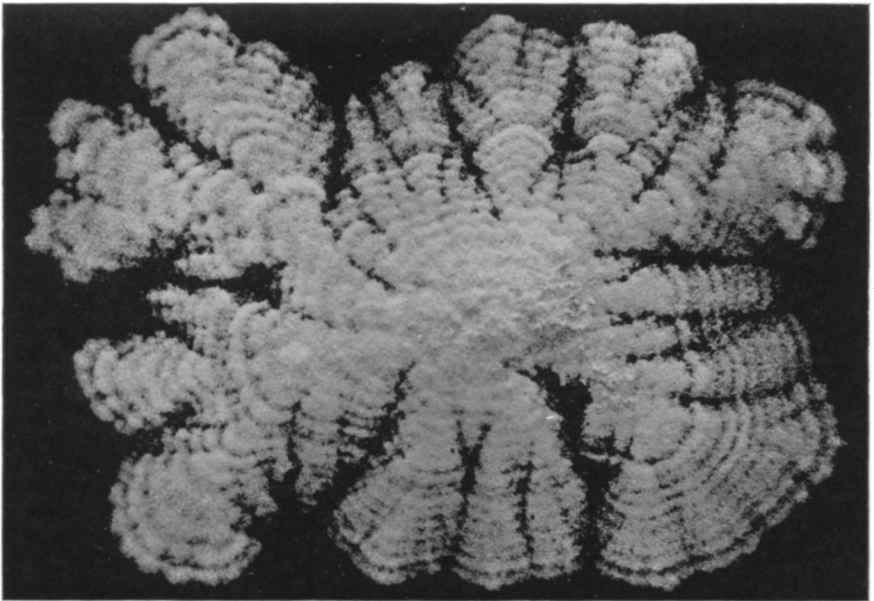
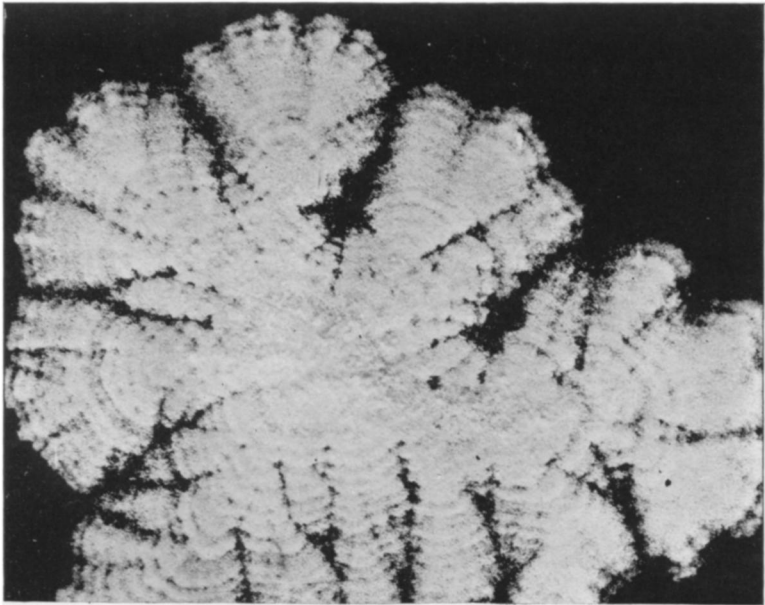
PENICILLIUM AND CEPHALOTHECIUM.



CEPHALOTHECIUM ROSEUM.



CEPHALOTHECIUM ROSEUM.



CEPHALOTHECIUM ROSEUM.